Issues and questions for the NEPEC regarding the WGCEP
(Presented by Tom Jordan to the NEPEC at its 10/17/06 meeting.)

1. The WGCEP appears to be on track for delivering an earthquake rate model to the NSHMP and a time-dependent UCERF to CEA. The MOC commends the ExCom for its excellent work in developing and executing the project plan.
- http://www./WGCEP.org/actionItems/schedules/UCERF2_schedule.html

2. The BSSC has informed USGS that final hazard maps to be considered in the code update process must be submitted no later than February 15, 2007. This unexpected revision to the timeline (originally April, 2007) accelerates the delivery of WGCEP products to the NSHMP.

2a. In order to allow sufficient time for a thorough review of the WGCEP product, a revised date of January 2, 2007 has been established for the earthquake rate model. The report will completely document the model and include the appendices necessary to document any major unpublished model components, so that they can receive an individualized review. A revised report will be provided to USGS NSHMP by February 1 to allow its incorporation into the hazard map update by Feb. 15.

2b. The MOC considers the documentation of previously unpublished data used by the WGCEP to be the most challenging deadline for the project. Under a strict interpretation of the legal requirements, all data components used in the earthquake rate model must be published either in journal articles or open file reports (USGS or CGS) by Feb. 15. This includes paleoseismologic data and the earthquake catalog.

QUESTION TO NEPEC: What degree of "publication" should be required for the underlying components of the model; i.e., what flexibility should be allowed with respect to the standards and dates outlined above?

2c. An internal review of the WGCEP products for the NSHMP will be conducted by the SRP during January. These products will be made available to NEPEC and CEPEC for review in this period. The MOC is in favor of conducting such external reviews.

QUESTION TO NEPEC: Does NEPEC agree to review the WGCEP products for the NSHMP during January, 2007?

2d. The increased spread between the NSHMP and CEA deadlines may make it harder to maintain coherence between the NSHMP rate model and the eventual UCERF rate model.

QUESTIONS TO NEPEC: To what degree should the model used for the USGS hazard map update for California correspond with the CWGEP earthquake rate model? Should they be one and the same or is some divergence appropriate or

even potentially necessary?

3. The major scientific issues for the earthquake rate modeling include:
    i.   A-faults
    ii. Magnitude-area relationships
    iii. Magnitude bulge
    iv. Segmentation, multi-segment ruptures and cascades
    v.   Background, fault-based G-R, aftershocks, C-zones

3a. Workshops on the first two are being planned for November.

3b. The last three issues play into the "Battle of the Bulge": Between magnitude 5.0 and 6.5, the model b-value is around 0.5, lower than the historical data. This anomaly, which has been present in all CGS/USGS models since 1996, can be interpreted as a bulge around M6.5 (predicted rate > the historical rate) or a trough around M5.0 (predicted rate < the historical rate) . Cause(s) of the bulge is (are) uncertain. Possible (partial?) reasons include
    ▪ A & B faults (not enough multi-segment ruptures; minimum magnitude too high?)
    ▪ C Zones (maximum magnitude too small, pure G-R distribution; no characteristic earthquakes?)
    ▪ Background (higher % than historical?)
    ▪ Aseismic (what % outside of Bay Area and creeping section is creep?)
    ▪ Post-seismic (aftershocks, after-slip?)

4. Once the Jan. 2 deadline is achieved, the WGCEP effort will be focused on the time-dependent UCERF. The main issues include:
    ▪ Conditional probabilities when both single and multi-segment ruptures are included
    ▪ Importance of Poisson vs. renewal vs. triggering/clustering models
    ▪ Treatment of apparent 1906 stress shadow
    ▪ COVs for renewal models
    ▪ Triggering/clustering models: Coulomb stress calculation (e.g., Stein et al. or BPT-step) or empirical (STEP) models?
    ▪ Data compilation (e.g., how to define data of last events for unsegmented models).

5. A large workshop on the time-dependent model will be help in April, 2007, to present the modeling framework and solicit community input (similar to the NSHMP California workshop held at the beginning of October).
    ▪ Workshop 7 (March or April 2007): present and discuss viable options with entire community
    ▪ Workshop 10 (~ Aug 15th): present what has been implemented (UCERF 2.0) to the entire community, just like the recent NSHMP workshop

6. A draft of the final WGCEP report to the CEA will be due on August 1, 2007.

The report will completely document the model and include the appendices necessary to document any major unpublished model components, so that they can receive an individualized review.

6a. An internal review of the WGCEP products for the CEA will be conducted by the SRP during August. These products will be made available to NEPEC and CEPEC for review in this period. Such external reviews are required for completion of the project. The final WGCEP report documenting the UCERF must be submitted to the CEA by September 30, 2007.

QUESTION TO NEPEC: Does NEPEC agree to review the WGCEP products for the CEA during August, 2007? If so, should a special NEPEC/CEPEC/SRP meeting be scheduled for this review, perhaps as a one-day session of Workshop 10?